MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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INTRODUCTION.

The MONTHLY WEATHER REVIEW for July, 1901, is based on reports from about 3,100 stations furnished by employees and voluntary observers, classified as follows: regular stations of the Weather Bureau, 159; West Indian service stations, 13; special river stations, 132; special rainfall stations, 48; voluntary observers of the Weather Bureau, 2,562; Army post hospital reports, 18; United States Life-Saving Service, 9; Southern Pacific Railway Company, 96; Hawaiian Government Survey, 200; Canadian Meteorological Service, 32; Jamaica Weather Office, 160; Mexican Telegraph Service, 20; Mexican voluntary stations, 7; Mexican Telegraph Company, 3; Costa Rica Service, 7. International simultaneous observations are received from a few stations and used, together with trustworthy newspaper extracts and special reports.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Mr. Curtis J. Lyons, Meteorologist to the Hawaiian Government Survey, Honolulu; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Mr. Maxwell Hall, Government Meteorologist, Kingston, Jamaica; Capt. S. I. Kimball, Superintendent of the United States Life-Saving Service; Commander Chapman C. Todd, Hydrographer, United States Navy; H. Pittier, Director of the Physico-Geographic Institute, San Jose, Costa Rica; Captain François S. Chaves, Director of the Meteorological Observatory, Ponta Delgada, St. Michaels, Azores, and W. M. Shaw, Esq., Secretary, Meteorological Office, London; Rev. Josef Algué, S. J., Director, Phillipine Weather Service.

Attention is called to the fact that the clocks and self-registers at regular Weather Bureau stations are all set to seventy-fifth meridian or eastern standard time, which is exactly five hours behind Greenwich time; as far as practicable, only this standard of time is used in the text of the REVIEW, since all Weather Bureau observations are required to be taken and recorded by it. The standards used by the public in the United States and Canada and by the voluntary observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is 157° 30′, or $10^h\ 30^m$ west of Greenwich. The Costa Rican standard of time is that of San Jose, $0^h\ 36^m\ 13^s$ slower than seventy-fifth meridian time, corresponding to $5^h\ 36^m$ west of Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by voluntary observers or newspaper correspondents are sometimes corrected to agree with the eastern standard; otherwise, the local standard is mentioned.

Barometric pressures, whether "station pressures" or "sea-level pressures," are now always reduced to standard gravity, so that they express pressure in a standard system of absolute measures.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

In accordance with the general directions of the Secretary of Agriculture, the following forecast districts were established July 1, 1901:

Boston center.—All of the New England States.

Chicago center.—Illinois, Indiana, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, South Dakota, North Dakota, and Montana.

Denver center.—Colorado, New Mexico, Arizona, Utah, and Wyoming.

San Francisco center.—California and Nevada.

Portland, Oreg., center.—Washington, Oregon, and Idaho.

Galveston center.—Texas, Oklahoma, and Indian Territory, and advisory warnings for Mexico, and charge of the cooperation between the Mexican Weather Service and the United States Weather Bureau.

Washington center.—All States not included in the foregoing districts.

The instructions provide that the official in charge of each forecast center shall issue morning forecasts, cold wave, frost, and other warnings, except hurricane and emergency warnings, and all storm warnings for his district, forwarding copies of the same immediately by telegraph to Washington, D. C. Night forecasts, synopses, and cold-wave warnings for all districts, except San Francisco, Cal., and Portland, Oreg., will be made at Washington. The officials in charge at San Francisco and Portland will make night forecasts and warnings for their respective districts.

Forecasts of the direction and force of the wind and the state of the weather along the transatlantic steamer routes from the American coast to the Banks of New Foundland were issued daily at 8 a. m. and 8 p. m. These forecasts covered the first three days out, of steamers bound east from United States ports, and the morning forecasts were published, together with forecasts of fog, in the weather maps issued at Boston, New York, Philadelphia, Baltimore, and Washington.

The principal meteorological feature of the month was the intense heat which prevailed in the States of the central valleys and the middle-west. The heated period began about June 20, and continued until July 26, and the records of maximum temperature were exceeded generally in the States of the middle and upper Mississippi and middle and lower Missouri valleys. During this period an absence of general rains resulted in drought conditions which caused great damage in the corn belt of the districts named. These conditions were covered in the daily forecasts and synopses and

in special forecasts, and the breaking up of the heat and drought during the closing days of July was indicated well in advance by the forecasts.

Two disturbances of tropical origin reached our southern coasts during the first decade of the month. The first of these appeared in the vicinity of Barbados on the 2d, passed thence north of west over the Caribbean Sea to the Yucatan Channel by the night of the 7th, and reached the Texas coast on the 10th. This disturbance had the character of a large shallow depression, rather than that of a well-defined hurricane. Reports show that high winds were encountered northwest of Barbados on the 2d, and that severe wind and rain storms occurred along the south coast of Haiti on the 4th. Rough weather was also reported off the south coast of Cuba during the 8th. Passing from the Yucatan Channel the center of disturbance reached the Texas coast on the 10th, where the earlier signs of its approach were of an alarming character. Beginning on the 9th, Texas coast interests were fully informed by the Weather Bureau relative to the advance of the disturbance over the Gulf, and on the 10th the Bureau was able to issue advices that allayed the fears of the people.

The second storm referred to appeared over the eastern Caribbean Sea on the 6th, passed on a northwest course south of Porto Rico on the 7th, causing a wind velocity of 56 miles an hour at San Juan, skirted the eastern Bahamas on the 8th and 9th, arrived off the North Carolina coast on the 10th, and acquired marked intensity during the night of the 10th, when a maximum velocity of 64 miles an hour was reported at Hatteras, N. C. After the morning of the 11th the storm diminished rapidly in energy. Timely and accurate advices were telegraphed all points in the West Indies and on our southern coasts which lay in the path of these disturbances.

The tracks of the disturbances referred to are shown in part on Chart II.

BOSTON FORECAST DISTRICT.

The weather of the month was without unusual features, excepting, perhaps, the periods of high temperature. The changes to cool weather were correctly forecast, and the forecasts of rain were, as a rule, timely and successful.—*J. W. Smith, Forecast Official.*

CHICAGO FORECAST DISTRICT.

The month was remarkable on account of the intense thermal conditions and extraordinary drought which overspread the greater portion of the great central valleys of the Southwest for three consecutive weeks or more. Temperatures of 100° or over were recorded nearly every day from the 1st to the 25th in the central Mississippi and central and lower Missouri valleys. The maximum temperature records for July, and in fact for all months, were broken in nearly all the middle-west and southwest States. Maximum temperatures of 104° to 108° were recorded several times in the States of Iowa, Illinois, Missouri, and Kansas.

From the 6th to the 26th, inclusive, no rain, other than a few local showers on the 16th and 18th, occurred in central and southern portions of Illinois, Iowa, Missouri, Kansas, Nebraska, and South Dakota, practically covering the greater portion of the important corn-growing section. From the 27th to the 30th, inclusive, the drought was broken by more or less copious and general showers.—*F. J. Walz, Local Forecast Official.*

GALVESTON FORECAST DISTRICT.

But one important disturbance occurred during the month. On the 9th the morning weather map showed a disturbance over the lower Rio Grande Valley. The evening report of the 9th showed a storm of considerable intensity in the north of Mexico, off the mouth of the Rio Grande River. In the morning general forecast attention was called to the disturbance, and in the evening storm warnings were issued to all stations along the Texas coast. The tide rose rapidly and caused much uneasiness. The conditions were watched closely, and at 3:30 a. m. of the 10th the following bulletin was given to the press:

The barometer is 29.78. The wind is 34 miles from the east, with occasional shifts to southeast. The east wind for the last two days has banked up the water and the tide is running quite high, but no swells are breaking in over the beach. The water is up to Avenue O at Twenty-fifth street. I believe that 2 feet additional rise will put the water across the island at Twenty-fifth street. This will depend a great deal on the force and direction of the wind during the next twelve hours. A flood of a serious nature is not yet indicated, although small buildings near the beach may be washed over. This matter will be watched closely by the Weather Bureau. If any serious change developes, the people will be fully advised.

At 9:30 a. m. the following information was given out:

Tide has receded 3 feet and is now stationary.

At 3 p. m. the following bulletin was issued:

Conditions less threatening; tide 2.5 feet and falling; disturbance apparently moving north to the west of Galveston.

These bulletins, which were given out through the press and over the telephone, allayed the fears of the people and proved very valuable.—*I. M. Cline, Forecast Official.*

DENVER FORECAST DISTRICT.

The low areas, generally ill defined, were a prominent feature of the pressure distribution, and, as the few high areas that appeared in the district northwest were of slight intensity, the month in the northern half of the district was characterized by exceptionally high temperatures, and a marked deficiency of precipitation, though thunderstorms were frequent. At Denver the month was the dryest July and the warmest month in thirty years, the period covered by the records.

In the southern half of the district the weather was generally seasonable.—*F. H. Brandenberg, Forecast Official.*

SAN FRANCISCO FORECAST DISTRICT.

During July storms of the Sonora type may be expected to move along the Mexican boundary westward, recurving over southeastern California, and thence moving northeastward across Nevada and Utah into Wyoming. When there is reason to suppose that the so-called "permanent high" of the south Atlantic coast lies farther to the west than usual, the paths of the storm through Arizona and New Mexico are, as a rule, farther to the west. Early in the month this westerly shift of the Sonora storm tracts was anticipated, and the results seem to have justified the expectation. An area of high pressure over the North Pacific remained in possession during the greater part of the month, and was probably the determining factor in the weather of the Pacific slope.

There was little or no rain in California until the end of the month. There was also less of the summer afternoon fog along the central coast.—*Alexander G. McAdie, Forecast Official.*

PORTLAND, OREG., FORECAST DISTRICT.

The month was seasonable, except that it was a trifle cooler than usual, and on the morning of the 4th light frosts occurred in southeastern Idaho, which were successfully forecast twenty-four hours in advance. No high nor hot winds